FOREST MANAGEMENT UPDATE

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— Trees — A Growing Green Legacy
— Validation of Publication, *Using Diagnostic Plants to Evaluate Site Class*
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. . . for Forestland Managers and Others Interested in Stewardship of the Forest Resource.

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Cover Picture: *Tom Schuler, Northeastern Research Station, identifies oak regeneration in the younger age class of a two-aged stand.*

***Note:* All articles contained in Forest Management Update are written by Arlyn W. Perkey (•AWP•) unless otherwise noted.**

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Regeneration Results Using Two-Aged Management

by
Arlyn W. Perkey,
Gary W. Miller,
and Thomas M. Schuler

Two-aged management is receiving increasing consideration by central Appalachian hardwood managers as a tool to accomplish multiple landowner goals. On non-industrial private forests where aesthetics are often important, two-aged management has the attribute of retaining some relatively large trees on the area at all times. For many landowners this is critical. Research at the Fernow Experimental Forest near Parsons, West Virginia, shows the two-aged system can also provide a means of obtaining desirable regeneration of species that are both tolerant and intolerant of growing beneath overtopping vegetation.

By definition, a two-aged stand has trees of two distinct age classes separated in age by more than 20 percent of the rotation age. In the central Appalachians, a rotation age of 80 years is often appropriate for managed stands to accomplish landowner goals. Once established, two age classes are maintained by a harvest about every 40 years. Consequently, while the age of the two classes changes through time, the 40-year difference between the younger and older age classes is constant. When the older age class reaches 80, the younger age class is 40. When the 80-year-old trees are removed, the 40-year-old trees become the older age class. The growing space formerly occupied by 80-year-old trees is captured by regeneration that becomes the new, younger age class. This 40/80-age relationship is desirable because by age 40 the younger age class has obtained sufficient height to be in the main crown canopy. When the older age class is removed, there is less damage to main-crown-canopy trees than to understory or midstory trees.

TWO-AGE MANAGEMENT--DEFERMENT CUTTING
FISH TROUGH
13 ACRES
SITE INDEX 80
A REGENERATION HARVEST METHOD USED BY GERMAN FORESTERS TO IMPROVE THE APPEARANCE OF CLEARCUTTING IS BEING TESTED IN THE EASTERN UNITED STATES. IN 1981, 13 MATURE HIGH-QUALITY TREES PER ACRE OF VARIOUS SPECIES WERE RETAINED, WHILE ALL OTHER TREES WERE HARVESTED. SINCE THEN, A VARIETY OF HARDWOOD SPECIES IN A NEW AGE CLASS HAVE BEEN DEVELOPING NATURALLY BENEATH THE OLDER RESIDUALS. TREE DEVELOPMENT, AESTHETICS, AND HABITAT CONDITIONS WILL BE MONITORED UNTIL THE PRACTICE IS REPEATED IN THE YEAR 2061.

This informational sign introduces the concept of two-aged management to visitors on the Fernow Experimental Forest. Regeneration established in 1981 is planned for harvest in 2061.

The 40-year time period also provides the opportunity to accomplish needed control of grapevines and precommercial release of crop trees. In steep terrain, when doing precommercial crop tree management, it is especially important to consider where the overstory trees will be felled when the older age class is removed.

The 40/80-age relationship can be varied somewhat to better accomplish stand objectives. Flexible timing of commercial harvests provides opportunities to accommodate:

1) development of advanced regeneration (doing site preparation work and waiting for a bumper seed crop).
2) selling products when market prices are favorable.

There are times when a 30/60- or a 50/100-age relationship is more appropriate. Factors influencing the appropriate choice are:

1) lifespan of managed crop trees.
2) timing of height growth of managed crop trees.
3) intensity of management.
4) importance of being able to market cut trees. (For example, are precommercial investments in the younger age class an option?)
5) site productivity.

For example, a stand with many black cherry crop trees on a productive site might be intensively managed on a 30/60-age relationship. Black cherry has a relatively short lifespan. It exhibits rapid early-age height growth, and it is frequently valuable enough to be marketed at a relatively small size.

Conversely, red oak grown on a medium site will have slower early-age height growth and a longer lifespan. If precommercial investments (less intensive management) are not an alternative, it might be grown on a 50/100-age relationship to accommodate growing trees for a longer time to achieve marketability of products from the younger age class.

A key concern is the species composition of the regeneration established under the open-canopy overstory. Major factors affecting composition are: site productivity, biotic regeneration influences, abiotic regeneration influences, residual overstory species composition (available seed source), and advanced regeneration.

Eighteen-year-old yellow-poplar crop trees are 7-10 inches dbh and thriving between scattered 20-27 inch dbh overstory residuals. Site productivity and available seed source are factors that favored yellow-poplar regeneration on this site.

SITE PRODUCTIVITY

Some species are effective competitors in a limited range of site productivity classes. For example, it is easier to get oaks into a competitive position on red oak Site Index 70 (medium site productivity) land than on Site Index 80 (good site productivity) land. In contrast, yellow-poplar is more likely to survive periods of drought and sustain rapid competitive growth on Site Index 80 and better land.

Under two-aged management, species composition of the regenerating age class can be expected to vary with site quality, much as it does under even-aged management. Sugar maple, basswood, black cherry, and yellow-poplar can be expected to be most competitive on medium and better sites. Red maple and red oak are often most competitive on the medium and fair sites. Chestnut oak is usually limited to fair and poor sites.

This red oak stump sprout should be competitive in this younger age class of a two-aged stand. Frequent occurrence of stump sprouts of a preferred browse species indicates deer pressure on regeneration was modest at the time of harvest.

BIOTIC REGENERATION INFLUENCES

Ecological conditions (plant and animal) at and around the time of canopy-opening harvest can affect species composition. In the central Appalachians, the current most prominent example of a biotic regeneration influence is the size of the deer herd relative to the availability of their preferred food supply. Some commercially desirable tree species are heavily browsed while less desirable species are undisturbed. Stump sprouts of deer-preferred species are especially vulnerable to browsing damage. Where deer populations are high, stump sprouts of preferred browse species are often eliminated as a source of regeneration. This is especially true in locations with limited recent harvesting in a large, contiguous forested area. In these instances, deer focus on the limited supply of recently created, nutritious food source.

Other biotic influences include insect defoliations, disease outbreaks, and grazing by domestic livestock. Some of these influences can be controlled by man (domestic livestock). Others (insect defoliations) can potentially be affected by human intervention, but seldom controlled. Some influences are management activities intended to affect regeneration. For example, site preparation that exposes mineral soil is a human-caused influence favoring species needing this condition in order to flourish.

The season of logging is another example of a human influence that can affect species composition. Logging during the dormant season favors establishment and development of yellow-poplar. Growing-season harvesting favors competing vegetation.

ABIOTIC REGENERATION INFLUENCES

Regeneration establishment and development can be affected by physical events like windstorms, floods, droughts, ice storms, and lightning fires. Species have varying capabilities to survive and compete when these events occur at a regenerating site. For example, species that are subject to breakage (yellow-poplar) are more likely to lose codominant position after an ice storm than a sturdier species such as oak.

RESIDUAL OVERSTORY SPECIES COMPOSITION (available seed source)

Species that exhibit rapid early-age height growth may be competitive in the new age class if there is an available seed source and appropriate site conditions (like exposed mineral soil). Species composition of the residual overstory is one indication of the availability of seed. However, species with light, wind-dispersed seed are also frequently able to successfully establish from parent trees adjacent to the treatment area. In central Appalachian hardwoods, yellow-poplar and black birch are two species that frequently establish from on-site or near-site parent trees.

ADVANCED REGENERATION

Frequently, to compete in the younger age class, species that have slower early-age height growth must be present as advanced regeneration before a major canopy-opening harvest. For example, oaks on highly productive sites are dependent on well-developed advanced regeneration to obtain a competitive codominant position in a regenerating age class.

Species that depend on advanced regeneration include sugar maple, oak, hickory, and white ash. When the deer population is very high relative to the food source, black cherry may also be dependent on advanced regeneration.

This red oak was approximately 75 years old when the harvest released advanced regeneration and provided favorable conditions for the establishment of seedlings from germinating seeds.

The regeneration profile on the following page provides information about four two-aged treatment areas on two ranger districts of the Monongahela National Forest and on the Fernow Experimental Forest. The information was taken from an article titled "Development and Quality of Reproduction in Two-Age Central Appalachian Hardwoods — 10-year Results" by Gary W. Miller and Thomas M. Schuler, both research foresters, Northeastern Research Station, in Parsons, WV. The table summarizes relevant information about each of the five factors, as previously discussed, that affect species composition in a naturally regenerating two-aged stand:

- Site productivity
- Biotic Influences
- Abiotic Influences
- Residual overstory species composition
- Advanced regeneration species composition

A sixth factor influencing species composition in a regenerating stand is the density of any residual overstory and midstory trees. This factor is not listed in the chart because it was relatively constant across the four treatment areas. All trees larger than 1-inch dbh were cut, except for selected overstory trees intended to comprise the older age class. Post-harvest basal area ranged from 17.5 to 25.8 square feet per acre distributed on 12 to 15 trees per acre. All of the treatment areas were in stands that averaged about 75 years of age when harvested to establish the younger age class in the two-aged stand.

The last column of the table describes the species composition that resulted from the interaction of the five listed factors on the regeneration process on the four sites. Evaluation of this data provides some indication of the species composition of regeneration when two-aged management is applied in central Appalachian Hardwoods.

> *<u>Note</u>: To properly sequence the two age classes on these sites, the 75-year-old residual trees are expected to remain on the site until they reach age 115. At that time, the younger age class will be 40 years old and ready to transition to the older age class.*

The graphs that follow the table display the information in the "Advanced Regeneration Species Composition" and "10-Year Species Composition" columns to provide a visual means for quickly assessing the role of advanced regeneration in stand development. The advanced regeneration (commercial tree species greater than 1-foot tall and less than 1.0″ in diameter) is represented by the lightly shaded box, and the dark shaded box is the commercial tree species 1.0″ dbh and larger 10 years after cutting.

Two-Age Regeneration Profile on Four Treatment Areas

Treatment Area	Site Productivity		Biotic Influences	Abiotic Influences	Residual Overstory Species Composition		Advanced Regeneration Species Composition		**10-Year Species Composition**	
	RO Site Index	Avg. Ann. Ht. Growth of Young Age Class (Ft./Yr.)			Species	Percent	Species	Percent	**Species**	**Percent**
Riffle Creek	70	2.8	Chestnut blight in the 1930's. Medium size deer population.[1/]	Absence of fire for the past 50 years.	RO WO YP CO RM HI SO BC	37 34 9 8 4 3 2 1	BE SM RM RO BC CO	47 22 10 8 4 3	**BE** **SM** **RM** **RO** **BC** **CO** **YP** **BB**	**17** **8** **13** **12** **5** **9** **8** **14**
Olson Tower	70	2.6	Chestnut blight in the 1930's. Medium size deer population.[2/]	Absence of fire for the past 50 years. Shallow soil; widespread skidding.	RO BC SM WA RM BE	49 38 5 5 2 1	BC BE	87 9	**BC** **BE** **RM** **RO**	**80** **4** **8** **5**
Fish Trough	80	3.0	Chestnut blight in the 1930's. Medium size deer population.[3/]	Absence of fire for the past 50 years. 1987 precipitation 17% below mean. 1995 precipitation 19% below mean.	YP RO BA BC BE CU HI WA EL SM	59 13 11 5 3 2 2 2 1 1	SM BE WA	59 21 12	**SM** **YP** **BA** **BB**	**27** **31** **9** **10**
Shavers Fork	80	3.1	Chestnut blight in the 1930's. Medium size deer population.[4/]	Absence of fire for the past 50 years. 1987 precipitation 17% below mean. 1995 precipitation 19% below mean.	YP RO WA WO BA CU BC	63 27 3 2 2 2 1	BE WA SM RO	52 22 16 2	**BE** **SM** **RO** **YP** **BB** **RM**	**10** **6** **5** **45** **8** **7**

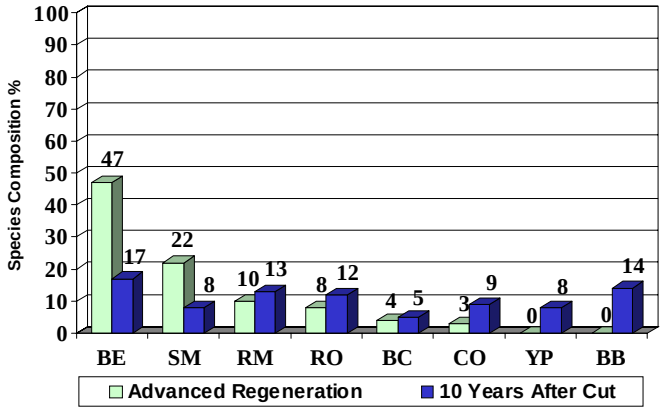
1/ Based on observation and calculation (50% of codominants are stump sprouts).
2/ Based on observation.
3/ Based on observation and calculation (42% of codominants are stump sprouts).
4/ Based on observation and calculation (62% of codominants are stump sprouts).

Species Key

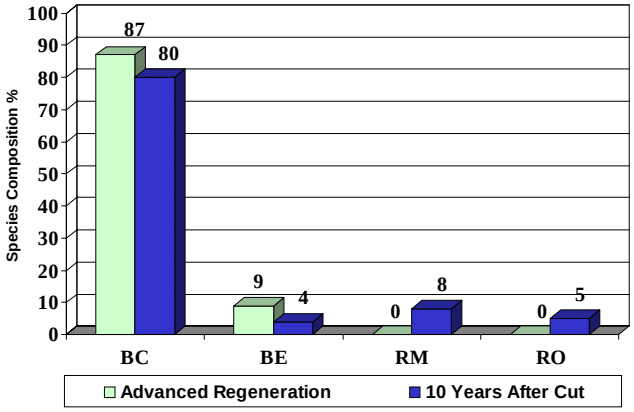
BA	Basswood	BC	Black cherry	EL	Elm	RO	Red oak	WA	White ash
BE	Beech	CO	Chestnut oak	HI	Hickory	SO	Scarlet oak	WO	White oak
BB	Black birch	CU	Cucumber	RM	Red maple	SM	Sugar maple	YP	Yellow-poplar

Graphic Display of Advanced Regeneration Versus 10-Year Species Composition

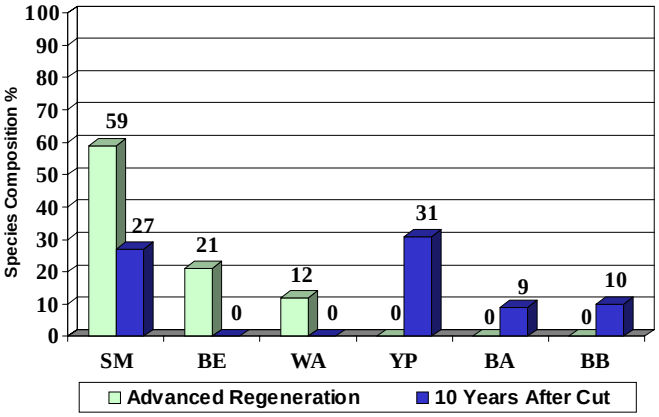
Riffle Creek
14.8 acres, SI 70
1,062 Trees/acre 10 Years After Cut



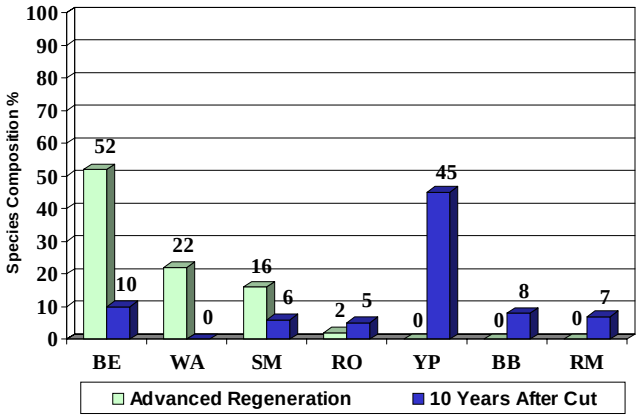
Olson Tower
12.1 acres, SI 70
933 Trees/acre 10 Years After Cut



Fish Trough
13.1 acres, SI 80
1,000 Trees/acre 10 Years After Cut



Shavers Fork
10.2 acres, SI 80
972 Trees/acre 10 Years After Cut



Advanced Regeneration: commercial tree species greater than 1-foot tall and less than 1.0" dbh
10 Years After Cut: commercial tree species 1.0" dbh and larger

Following are some observations and comments regarding the development of two-aged stands after a regeneration cut at four locations in the central Appalachians.

1. Leaving 12 to 15 residual overstory trees per acre and cutting all other trees 1-inch dbh and larger resulted in hardwood reproduction similar to that expected after clearcutting.

2. In three of the four treatment areas, the residual overstory is expected to be a commercially operable volume when the older age class is harvested. If there are 13 residual trees per acre and they average 200 bd.ft. per tree, that is 2,600 bd.ft. per acre. Larger trees will have correspondingly larger volumes.

3. In the Fish Trough treatment area, a sample of 10 yellow-poplar overstory crop trees was remeasured at about age 94 to determine if they were still growing well. They are. During the first 16 years of the study they grew at a rate of 2.9 inches/decade. During the last 3 years they grew at a rate of 3.2 inches/decade.

4. Residual overstory trees (the older age class) were still free to grow, with an average of 20 feet of growing space between adjacent crowns.

5. At 10 years, 70 to 85 percent of codominant reproduction had the potential to become timber crop trees. Three of the four treatment areas can be regarded as successfully regenerated with acceptable quality stems. The Olson Tower area is an exception. Cursory examination of the 15-year-old regeneration revealed disappointing results. The black cherry is heavily infested with black knot. The residual overstory is in poor condition with dead trees, dead tops, and abundant epicormic branches. This shallow soil site on a flat ridge was not a good location for a two-aged treatment.

6. The canopy of the younger age class was nearly closed after 10 years.

7. Frequently, grapevine control work is needed in the younger age class of two-aged stands, just as it is needed in young stands regenerating after a clearcut.

Grapevine control is just as critical in two-aged stands as it is in even-aged stands.

8. The younger age class is expected to develop for many years without serious competition from the older age class.

9. Species composition of the younger age class is variable, including tolerant and intolerant species, and stump sprout and seedling origin trees. Species composition at 10 years of age does not guarantee species composition at age 40. However, combined with other information in the regeneration profile and some knowledge of stand dynamics, it does give a basis to predict species composition at age 40. In the absence of any major intervening management activity, following are the three most predominant species expected to occupy the younger age class at each treatment area:

    - Riffle Creek – red oak, red maple, yellow-poplar
    - Olson Tower – black cherry, red maple, and red oak
    - Fish Trough – yellow-poplar, sugar maple, and basswood
    - Shavers Fork – yellow-poplar, red oak, and sugar maple

At the Fish Trough treatment area, yellow-poplar is predominant in both the younger and older age classes. Fifteen overstory trees of this size can be expected to cover about 40 percent of the canopy space.

The above is an indication that two-aged management can often be used to establish desirable regeneration similar to that found following clearcutting. As with any system, it is not appropriate for every site. This system is probably less financially efficient than even-aged management that includes the use of clearcutting. More frequent regeneration harvests and associated logging damage may preclude managing the equivalent number of crop trees per acre. However, the trade-off of being able to maintain some big trees on the site at all times makes this a desirable option for many landowners.

* * * * *

Loss On Your Family Farm Forest

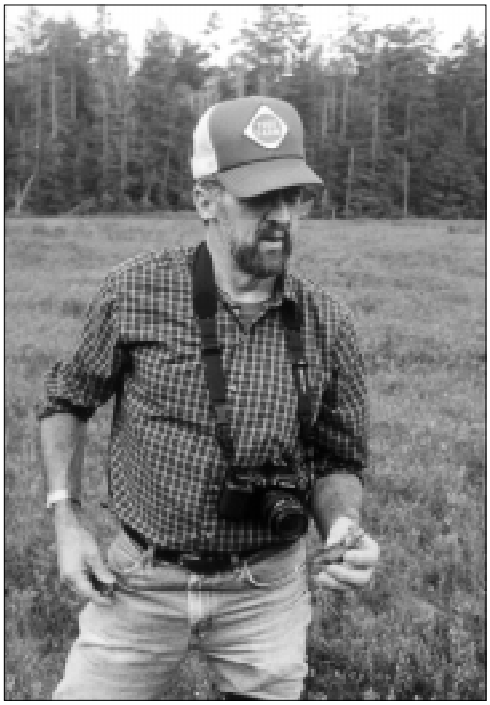
•AWP•

Spring of 1996 was my first real experience with losing crop trees to a damaging agent on my Pennsylvania tree farm. In my case, it was gypsy moth. Although losses were slight by most people's standards, it gave me some exposure to what it feels like to have invested and lost. When you save money, and put it with your own time and labor in a project you believe in, there is a part of you that goes into the making of a dream. You develop expectations of what the future will bring as the results of your dollars and sweat equity begin to be evident. I learned that watching those dreams be dashed away in an uncontrolled event is an emotional experience.

During the two years since then, I have encountered other tree farmers whose losses far exceed mine. This article describes one of those losses, and it really raises awareness of the risk of making long-term forest investments in eastern hardwoods. Hopefully, it will result in equitable treatment of tree farmers relative to traditionally recognized agricultural producers.

Tom and Sheila Thomson are the epitome of American Tree Farmers. Recognized in 1997 as the Northeast Regional Tree Farmers of the Year, they not only grow trees for profit, they steward their land in a way that provides multiple benefits for family, neighbors, and society. They walk the walk of good stewardship and share their love of the natural world with many others through educational tours.

Thomson Family Tree Farm is a "family" farm in the truest sense of the word. However, it produces wood, clean water, wildlife, and recreation instead of corn, cotton, or milk. The water, wildlife, and recreation are benefits provided without charge to society.



Tom Thomson, holding a pitcher plant, conducts many educational tours to share the wonders of the natural world with visitors.

The work the Thomsons do with kids is especially gratifying to them and a great benefit to future generations. True multiple-use forest landowners, Tom and Sheila's integration of timber, wildlife, recreation, and watershed management is enviable. Although they have been very effective educators for many school children, their greatest educational success is passing their stewardship ethic on to their son Stacey. This young entrepreneur developed his own firewood business when he was 12 years old. At age 20, he has become a certified logger, purchased a skidder, and established his own business — Thomson Timber Harvesting.

When the January 1998 ice storm struck northern New England, it damaged nearly 1 million acres of forestland in New Hampshire. The Thomson's 1,060-acre farm was in its

Many trees that weren't destroyed sustained significant crown damage in the form of broken limbs. Less leaf area will translate to reduced tree vigor and growth.

path of destruction. In just a matter of a few days, 90 percent of the Thomsons' trees on 900 acres were transformed from a productive, income-producing crop to a shamble of broken limbs, topless trunks, and bent poles and saplings. The roads and trails kids had walked to learn about the natural world were blocked with the woody debris. Healthy tree crowns that once produced the food for growth of the tree trunks were stripped of the branches that supported the leaves and transported sap so essential for vigorous growth. It is still wildlife habitat (greatly modified), but the value of the timber the land can produce in the next few decades is but a fraction of what it was.

One of the greatest losses is an area that Tom intended to have Stacey harvest with a traditional chainsaw felling operation. It is now off limits because of the dangerous conditions created by the ice storm. It is a job for a mechanical harvester (feller-buncher) that can cut the trees, control their fall, and place them in bunches. The feller-buncher equipment provides more protection for the operator and makes cleanup of this hazardous area a safer job.

All of this has happened to a family that is not only working to provide for their own future, but to be a source of economic activity in their community. They strive to be a force of social stability that supports the education of people in the management of natural resources for the long term. Some will argue that what happened to the Thomsons is a good example of what risk is all about. They made an investment, and they suffered a loss. It's all part of the cost of doing business. That is true, but isn't it also true that considering the benefits they are providing free to society (clean water, wildlife, and recreation), the least they deserve is to be treated equitably? Shouldn't they receive the same consideration as other family farmers?

But they do, don't they? No, they don't. After the ice storm, Tom and Sheila pursued all the avenues of support normally available after natural disasters. Unfortunately, to their dismay, they learned that timber is not considered an eligible agricultural crop by the United States Department of Agriculture's Farm Service Agency. From the agency perspective, timberland is not cropland, even if it is managed under a Stewardship Plan developed through the federally funded Forest Stewardship Program. Their inquiries about assistance did result in letters stating why the agency couldn't help. If the Thomsons were seeking disaster assistance for damage done to a sugarbush that generated annual income, they would be eligible for clean-up assistance through the Emergency Conservation Program. However, apparently since their income is periodic rather than annual, they don't fit into the traditional mold of agricultural producers that are served by farm programs designed to support the family farm. Similarly, they are not eligible for EM loans (EMergency loans) as the following excerpt explains.

> *"A timber owner, who only had woodland, and did not qualify as a farm by producing any other crop, would not be considered eligible for EM loans."*

The message in that statement is not very subtle. Tree farmers aren't real farmers unless they grow a crop other than timber that makes them eligible. That policy should change.

If this were a sugarbush, clean-up assistance would be available. Since it is "ONLY" woodland, it doesn't qualify.

What about the Small Business Administration? Can they help? Is Tom eligible for a disaster loan from them? A quote from their response –

> "*The Consolidation Budget Reconciliation Act of 1985 (PL99-272) prohibits the Small Business Administration (SBA) from providing disaster loans to agricultural enterprises. The SBA defines agricultural enterprises as those businesses engaged in the production of food and fiber, ranching and raising of livestock. Information provided with your application indicates that your primary business activity is the operation of a tree farm. Based on SBA guidelines, your business is not eligible for disaster loan assistance."*

That is difficult to argue with. Timber is clearly a fiber crop.

The loss of growth that Tom has accumulated since acquiring the property is not deductible from income taxes. Imagine a traditionally recognized agricultural producer losing their crop year after year and not being able to take it as a deduction from income.

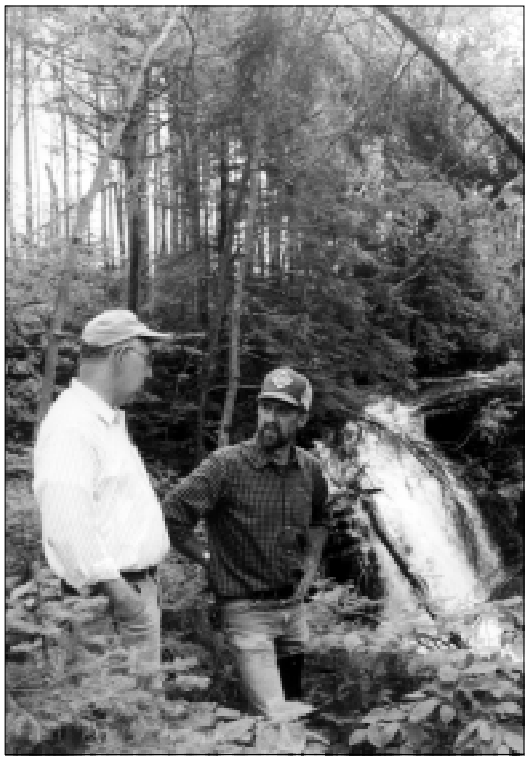
It is hard for a tree farmer not to feel like the lost soul that nobody wants. On one hand, timber growers are not eligible for assistance provided to other agricultural producers through the Farm Service Agency. On the other hand, they aren't eligible for assistance from the Small Business Administration because they are an agricultural enterprise. The inconsistency of the federal government's view of family tree farmers should be resolved.

Discovering this bad news was discouraging to Tom, but being of hardy Yankee stock, he commented to Sheila that they would deduct the loss from their income taxes. Wrong again, or at least the allowable deductible loss is much less than the true loss they incurred. While their loss certainly would appear to qualify as a casualty loss, their deduction is limited to the allowable basis of the timber less any compensation (like revenue from a salvage sale). That means their deduction can't be any more than the undepleted portion of the cost basis of the timber. Whatever increase in value they had realized because of tree growth and increase in timber prices is lost, and it is not deductible.

Apparently, the Internal Revenue Service has a perspective similar to the Department of Agriculture. Timber is not really viewed as an agricultural crop. Trees aren't seen as a commodity that grows every year and hopefully increases in value annually. Most family farm-size tree farmers don't sell their growth every year. To have a marketable quantity of timber they must accumulate multiple years of growth into a viable sale. If they suffer a casualty loss while growing that marketable quantity, it is not recognized. The loss of their increase in value from time of purchase is not acknowledged as a crop loss. That should change.

This is a sad story. What can tree farmers do about it?

- Timber should be viewed as a legitimate agricultural crop. It is a fiber crop, just as cotton and wool are fiber crops. It is unique in that for most family farm-size tree farms actual received income is not annual, it's periodic. That doesn't make tree farmers less creditable as farmers. In our verbal communications about tree farming, we need to refer to trees as an agricultural crop, a fiber crop. If we expect others to consider timber a legitimate crop, we have to describe it that way ourselves.



Considering the free benefits (clean, water, wildlife, and recreation) managed tree farms provide to society, the least they should receive in return is equitable treatment as legitimate agricultural producers.

- The Small Business Administration cites a law as the basis for their decision not to provide disaster assistance to tree farmers. The Farm Service Agency is basing their decision on interpretation at the National Office. It appears logical that the rationale for Congress prohibiting the Small Business Administration from getting into the agricultural arena is because the Department of Agriculture is intended to provide assistance to that community. The only way tree farmers will be recognized as customers to be treated equitably as farmers is if they consistently insist on and expect equitable treatment through appropriate channels. My intent is not to berate any government agency; my purpose is to call attention to a gap in service between two government agencies that should be filled. It appears most logical to me that the Farm Service Agency should fill that gap.

- Tree farmers can learn about and support the Tree Farm National Operating Committee's Resolution (see page 14) to the U.S. Congress to reform the tax code to allow Tree Farmers to take losses over and above their basis in response to Presidentially declared natural disasters, thereby encouraging the continued ownership of such disaster-affected lands.

- We need to recognize that as growers, the longer our crop is exposed to the elements, the greater the risk of loss from a damaging agent (wind, ice, insects, disease, fire, etc.). This fact favors the application of more intensive management practices to grow the desired product in a shorter period of time. This strategy doesn't eliminate the risk, but it does lessen it.

As I write this article I am reminded about all the forest fires in Florida (summer 1998) and thinking of the many tree farmers there who also have experienced the same kind of frustration Tom Thomson has had with ice damage in New Hampshire. Whether it is fires in Florida, floods along the Mississippi River, gypsy moth defoliation in Pennsylvania, or ice damage in New England, natural disasters happen to tree farmers too. It is not expecting too much to be treated equitably by agencies charged with administering disaster relief and acknowledging deductible losses. The benefits tree farms provide to society (wood, clean water, wildlife, and recreation) certainly warrant the same support that society provides to other agricultural producers. That won't eliminate all of the emotional impact of the loss when the natural disaster strikes, but it will encourage continued private investment in a long-term, risky business. If the concept of the family farm is worth supporting, so is the family farm forest.

*** * * * ***

A Resolution In Support of Sustainable Forests from the Tree Farm National Operating Committee*

Whereas the nearly 70,000 members of the American Tree Farm System, known as Tree Farmers, own and sustainably manage nearly 85 million acres of America's productive forestland, and

Whereas Tree Farmers have dedicated their forest lands to growing forest products, conserving and enhancing wildlife habitat, maintaining and ameliorating water quality, and providing recreational opportunities, and

Whereas natural disasters have had devastating effects upon Tree Farms, causing substantial financial loss and thereby increasing pressure to convert devastated forest land to non-forest uses, and

Whereas such non-forest uses are the single largest contributor to deforestation and fragmentation of America's forest resources, and

Whereas the U.S. Department of Agriculture and the Federal Tax Code fail to fully recognize the losses that Tree Farmers suffer as a result of natural disasters,

Therefore be it resolved by the Tree Farm National Operating Committee that the U.S. Congress reform the tax code to allow Tree Farmers to take losses over and above their basis in response to presidentially declared natural disasters, thereby encouraging the continued ownership of such disaster-affected lands, relieving pressure to convert said lands to non-forest uses, and enabling the continued sustainable management of forests for the benefit of all Americans.

** A reprint from Tree Farmer magazine, Nov/Dec 1998*

Trees — A Growing Green Legacy

•AWP•

Green — how so? Trees are a good green investment in three ways.

1. They are green in color during the growing season, and they are a pleasure to watch grow.

   Most people who are in the business of growing trees are not doing it because there are great short-term profits to be made. If you don't enjoy the business, you should stay out of it. There are easier, less risky investments available.

2. They are a socially responsible investment.

   Relative to most investments, the business of growing and harvesting trees is a non-polluting activity. It is also non-exploitative of both natural and human resources. Trees are a renewable resource. Although harvesting trees is a high-risk employment activity, relative to other industries, it provides equitable compensation for laborers and investors.

   Society greatly benefits from the amenity benefits of growing trees. Forests are highly preferred locations for recreational activities, from viewing to hiking to hunting. They are the preferred land cover for providing clean water so prized by an expanding human population.

3. They can be a financially profitable investment for landowners and an excellent, stable, long-term economic asset for communities.

This released black cherry crop tree is expected to produce a good return for the owner, food for wildlife, and employment in the community.

Although the first two reasons for investing in the business of growing trees are at least as important as the third, the focus of this article will be on the financial characteristics of tree-growing investments for individuals and families interested in transferring assets from one generation to the next.

Growing trees is financially attractive because:

- The increase in value of trees from price increases and growth in diameter, volume, and grade is tax deferred.

Trees don't send annual 1099's to the IRS. The landowner does pay annual property taxes, but the income from the eventual sale of timber usually qualifies for capital gains treatment when the timber is harvested. For most landowners, the capital gains rate is more favorable than their ordinary income rate.

- Investing in growing trees is an excellent opportunity to transfer wealth from one generation to the next, using the following strategy:

  The older generation (with the capital) purchases the asset (forestland) and invests in the development of that asset. After developmental investments (reforestation or release of crop trees), the asset is given or willed to the younger generation. At the time of inter-generation transfer, the asset is of only modest value. As the trees grow, they increase in value in the ownership of the second generation. Again, any capital gain on that growth is deferred until the time of sale of the timber.

TREE-GROWING COST STRATEGIES

Investors who grow trees use one of two strategies (either consciously or unconsciously) for absorbing costs of growing trees to profitable size. These are:

❑ Long-term cost strategy

This is the approach historically used by most forest products industries in the Northeast. The investors are conservative with cash outlays. They purchase the land, pay the taxes, minimize management costs, avoid labor costs, and hope something worthwhile grows on their land. If it does, they harvest it as cheaply as possible while meeting requirements to protect basic soil and water resources. There are no significant investments aimed at accelerating growth of individual trees, or to increase the number of high-value trees per acre. Consequently, trees grow at whatever rate the site and competitive vegetation permit without manipulation.

This strategy spreads the cost of growing a tree to a given size over a longer period of time than the short-term cost strategy described below. Investment costs are paid in the form of more property taxes and land holding expenses per unit of volume produced. The risk of loss because of damaging agents like drought, ice, wind, fire, insects, and disease is also greater because the asset is exposed for a greater length of time.

❑ Short-term cost strategy

This strategy is more commonly used by forest product industries in the South where the length of time for achieving the desired product size is shorter. Investments in land holding costs, property taxes, and administrative expenses are minimized per unit of volume produced. This is accomplished by increasing the number of crop trees per acre and accelerating the growth of those crop trees through management activities. In the South, that often means planting trees and thinning them. A greater volume of high-value product is

produced in a shorter period on a smaller land base. In the Northeast, it generally means precommercial release of potentially high-value crop trees. There are instances when planting is appropriate to increase the number of potential crop trees per acre, but often natural regeneration is sufficient.

The short-term cost strategy is often appropriate for non-industrial private landowners who want to make a transfer of assets from older to younger generations.

The primary disadvantage of the strategy is that it requires more up-front capital, as well as knowledge and interest. It is a more proactive course of action with more treatments that must be directed by management. However, in many cases, on good timber growing land, it is probably the most cost-effective alternative.

This is a logical strategy for non-industrial private landowners who want to make an intergeneration transfer of assets. The older generation with capital can make the investments and the younger generation receives the benefit.

To clarify the difference between these two strategies, I will use an example of two identical 12-inch red oak crop trees that two landowners are fortunate enough to have on their property at the time of purchase. One is growing on a long-term cost strategy owner's land and the other on a short-term strategy owner's land.

√ Long-term cost red oak

The landowner does not release this 12-inch crop tree, and it grows at a rate of 2 inches/decade. In 40 years it is 20 inches in diameter and ready to harvest as a high-value product. The landowner pays property taxes for forty years, and has land holding capital tied-up forty years.

√ Short-term cost red oak

The landowner releases this 12-inch crop tree, and it grows at a rate of 4 inches/decade. In 20 years it is 20 inches in diameter and ready to harvest as a high-value product. The landowner pays property taxes and land holding capital costs for only half as long as the landowner using the long-term strategy. However, he must make the up-front investment in releasing the tree from competing trees. If that work cannot be done with a commercially operable thinning treatment, it is an out-of-pocket investment. It requires management, labor, equipment, and materials to accomplish.

IF GROWING A GREEN LEGACY IS SUCH A GREAT IDEA, WHY AREN'T MORE PEOPLE DOING IT?

1. Awareness

   Most people with capital they want to transfer to the next generation are not aware that investing in growing trees is a good mechanism to accomplish that goal.

2. Knowledge

   Most potential investors do not have the knowledge base needed to make good forest management investment choices.

Potential investors must be willing to invest some time in acquiring awareness and knowledge to develop their God-given interest in growing a green legacy.

3. Interest

   Most potential investors do not have the interest in acquiring the necessary skills needed to make good long-term forest management investment choices.

4. Attractive Alternatives

   In this country, we are fortunate to have a wide range of investment alternatives. Some of them are easy to manage and provide a respectable return. In short, the competition for investment capital is intense.

5. Non-typical Return-on-investment Periods

   Timber management investments often give new definition to the phrase "long-term investment." To most people, investments of 10 to 50 years with no intermediate returns is incomprehensible. However, in the tree-growing business, these investment time periods are common. People with traditional schooling in financial management in this country will usually quickly reject long-term timber management investments.

6. Ease of Finding Desirable Investment Packages

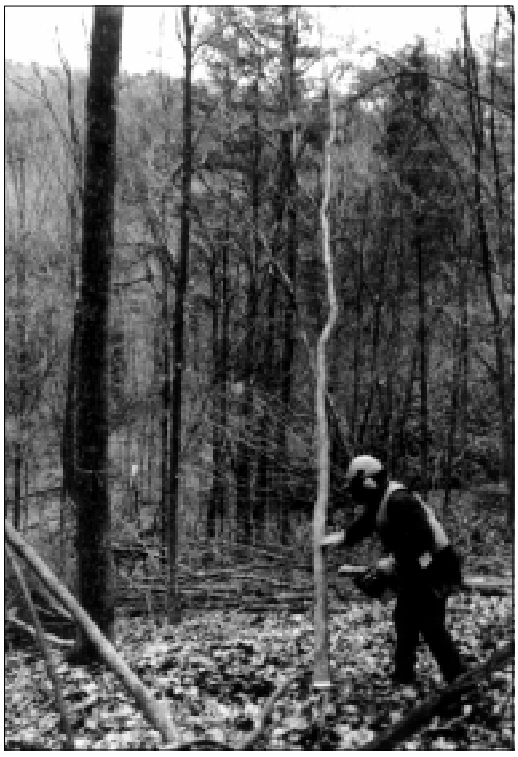
   Good investment opportunities often aren't easy to find packaged together in marketable form. For example, a 200-acre property is not likely to be all high-site productivity land stocked with healthy, vigorous, potentially high-value trees that will have a good growth rate. There are many variables affecting the quality of investment opportunity with each individual purchase option. Finding good options usually requires more than just luck. It often requires professional skill.

7. Risk

   Almost all long-term investments are risky. Some of the risks associated with timber management are drought, ice, insect damage, disease, fire, and market changes.

8. Focus

   The long-term investment strategy requires self-discipline to refrain from the temptation of chasing short-term, low-income rabbits. For example, when releasing crop trees it may appear wasteful if the cut trees are not removed and utilized. If the landowner has limited time and energy to invest in the endeavor, expending time removing the wood for a low return-on-investment may be an unwise distraction. Other similar distractions may produce no income. Frequently, landowners invest an inordinate amount of time mowing grass or maintaining facilities (buildings) that aren't essential to the long-term investment.



Many landowners have difficulty focusing their time, interest, money, and energy in the woods instead of on their lawns and buildings.

In summary, to use the business of growing trees as a means of transferring assets from generation to generation, the investor must **BELIEVE** the following:

- Society will continue to recognize the value of the free enterprise system and the right of individuals to accumulate assets and transfer them to others. Managed forests where trees are not only grown but harvested, must be recognized as a socially acceptable, even desirable private asset that produces social and economic benefits for communities as well as individuals. In short, that society will agree with the investor that growing and harvesting trees is a green activity.

- There will continue to be a premium price paid for high-quality sawtimber and veneer products. While prices will fluctuate, over a long period there will be good opportunities to sell high-quality products at a price that will make the return on investment at least acceptable.

- That they and their heirs have sufficient capital to sustain a long-term investment with potential extended periods of little or no intermediate returns. Property taxes, management fees, labor costs, equipment purchases, materials, and supplies must be absorbed with the anticipation of future return.

- That they and their heirs have the tenacity to handle the psychological rigors of an investment that has the previously described characteristics. Not all people are willing to wait for an asset to increase in value. Some are impatient. Others are too worried about investment performance. It takes a certain personality type who is willing to work and invest with confidence that eventually it will all be worthwhile for someone. Often, someone else. Are you and your heirs that kind of people?

*** * * * ***

Validation of Publication, *Using Diagnostic Plants to Evaluate Site Class*

During the summers of 1997 and 1998, Dr. Ken Carvell, retired silviculture professor, West Virginia University, contracted with the Northeastern Area State and Private Forestry to validate the applicability of the publication, *Using Diagnostic Plants To Evaluate Site Class*, NA-TP-03-97, in additional areas in West Virginia and Ohio.

The initial work was limited to a four-county area in northern West Virginia and southwestern Pennsylvania. Validation work has been done using subsections identified in "Ecological Units of the Eastern United States: First Approximation," 1995. Following is a summation of the validation work:

SUBSECTION NAME	NUMBER	FINDINGS
Pittsburgh Low Plateau	221 Ea	Diagnostic plants in the publication can be used throughout the subsection.
Western Allegheny Mountains	M221 Bb	Diagnostic plants can be used except at the highest elevations where red spruce and hemlock comprise a significant part of the crown canopy, and at moderate elevations where hemlock is 50% or more of the overstory.
Ohio Valley Lowlands	221 Ec	Diagnostic plants in the publication can be used throughout the subsection. It was noted that site class 5 (xeric) was less common than in the adjacent Pittsburgh Low Plateau. Mountain laurel and teaberry were absent from most of the xeric sites visited.
East Hocking Plateau	221 Ed	A preliminary examination of this subsection revealed promising potential for application of the publication, but further investigation is needed. Additional diagnostic plants will need to be identified to distinguish dry from xeric sites.

A trial site class mapping project was completed to confirm the appropriateness of a plot-spacing scheme to identify areas of relatively equal productivity. The project was on a 178-acre tract. Transect lines were oriented into topographic changes (up and down hill) at 600-foot intervals. Plots were spaced along these lines at 200-foot distances. At a plot location, the mapper determined aspect with a compass and estimated slope position to make a preliminary evaluation of site class. The existence and frequency of occurrence of diagnostic plants were then considered to see if the preliminary determination needed to be altered.

Diagnostic plants are especially helpful when making a site class determination in a transition zone between classes. When considering forest management investments, use of this site evaluation tool to classify units according to productivity can result in more efficient use of financial resources. The end result should be improved goal accomplishment.

Copies of Dr. Ken Carvell's reports for 1997 and 1998 may be obtained by contacting the Morgantown Field Office.

No Ecosystem Management — Another Perspective

I received many concurring responses to the article titled, "No Ecosystem Management on My Stewardship Forest" in the *Forest Management Update*, Issue 18. I also received a thoughtful letter from Jack McShane from Andes, New York, who presented another perspective to consider. The following is an excerpt from his letter.

> *First let me state that your work in the Lennox Forest and all other efforts by the New York City Watershed Forestry Committee is an attempt to manage an ecosystem on a landscape level! The goal is not ecosytem restoration, but to maintain an ecosystem as it stands, with its exotics and man-made disturbances, that is presently functioning well, and producing a multitude of forest products such as recreation, timber, and of particular importance, quality drinking water for residents, and the New York City masses. This management is being attempted through a volunteer basis (by landowners) and the tool of the educational process by the experts such as yourself. The alternative is eminent domain and strict regulation by New York City Department of Environmental Protection which the city is empowered to do as per the New York State Constitution.*
>
> *Although I know there is great fear amongst some private landowners here and particularly the northwest that when they hear the term "ecosystem management on a landscape level" that the black helicopter with the UN insignia (or maybe even USDA FS) will arrive to enforce restrictions on their private property. This unfounded fear and paranoia exists. I think the sophisticated, educated publics know better. If one stewards his land as you and I do, we should not fear being apprised of consequences, good or bad, that might affect the ecosystem either locally or broadly. We might agree to change something voluntarily if it was shown that it would benefit society. I am not a lover of regulation, but when there is a <u>valid</u> reason and enforced in a fair fashion, it is necessary. An example would be the unusual landowner who would toss the old filter from his tractor after an oil change into a protected trout stream – regulation needed!*
>
> *I am comfortable with the fact that you manage your forest in such a manner that will not negatively affect the present ecosystem. There is no pressure to <u>restore</u> a prior ecosystem. If the goals you wanted to achieve on your land necessitated you to fill it with toxic waste then yes, you would be told to subordinate those goals by government authority – thank goodness!*
>
> *There is no question that the statement "that in their opinion, there is too much at risk to wait for voluntary ecosystem management to occur" is a frightening one to private landowners. Luckily here in the New York City watershed New York City did not take that tact. It is hoped that through good stewardship brought about by the educational process (demo forests, etc.) landscape level ecosystem management by a higher authority can be avoided. Reality is of course that as the human population expands out of control some type of landscape level management probably will occur more often – If we are to avoid Calcutta type environments.*
>
> *Bottom line — I will continue to manage and steward my forest much as you do, but will try to also keep an eye on the overall ecosystem so that my practices do not negatively impact it (in my view).*

Monitoring Tree Growth — When The News Isn't Good

•AWP•

I have monitored crop tree growth on my own tree farm for several years. In many cases, the results indicate satisfactory progress toward reaching diameter growth goals. In a few instances, the results are disappointing. What do you do when that happens?

The issue was brought to the forefront for me when I received some growth monitoring data from a friend and fellow tree farmer from Illinois, Dan Schmoker. The growth on his black walnut is impressive — 4.25 inches per decade. That made me think about my pathetic average of 1.9 inches per decade on ten black walnut trees averaging 11.2 inches in diameter. They are growing on a mid to upper north-facing slope that was previously pasture for livestock. It does not have the deep, well-drained, loamy soil generally recognized as a good site for walnut. It would have been best if I would have fully appreciated that fact when I was selecting crop trees to release, but knowing their performance is poor now is better than waiting 20 years to find that I did not accomplish my objective.

Black walnut on this upper, north-facing slope has not grown well following release. In contrast, red oak and sugar maple have produced very satisfactory results.

I now have 8 years of growth as a basis for judgment on how black walnut will grow on this site. Following is individual tree growth data:

Tree No.	1990 dbh	1998 dbh	Growth Rate (in./decade)
1	9.3	10.9	2.0
2	10.4	12.0	2.0
3	10.5	11.6	1.4
4	9.7	11.2	1.9
5	10.0	11.5	1.9
6	9.5	11.0	1.9
7	10.3	11.6	1.6
8	7.9	9.4	1.9
9	10.5	11.8	1.6
10	9.7	11.6	2.4

Tree number 1 is located lowest on the slope and tree 10 is highest. With the exception of trees 3 and 10, most lower-slope trees performed somewhat better. Tree 10 is located on a favorable microsite. The six trees that are growing 1.9 to 2.0 inches/decade average 11.0 inches dbh. If they are allowed to grow three decades at that rate, they could average 16.8 inches dbh. I will be 82 (if I'm around) and my son will be 52. That is a disappointing performance indicating poor prospects for the future.

What should I do with these and similar previously selected black walnut crop trees in the stand? Here are some alternatives.

1. Retain the crop trees.

    - Do not invest in additional pre-commercial release of the crop trees. If competition reduces the growth rate, accept that until either the crop trees are financially mature or competitor trees are valuable enough to be merchantable.

2. Cut the crop trees now.

    - The trees are not of marketable size at this time. Consider the previous investment in release a bad venture, and make additional investment to fell these trees to provide growing space for recently established desirable regeneration.

3. Cut some and leave some.

    - Cut the poorest performers at this time. On the non-monitored crop trees, performance will be judged on the basis of crown vigor, location on the slope, and apparent potential future value of the butt log.

I have chosen alternative three. This will provide openings of sufficient size to permit the continued development of desirable regeneration that was established following the initial treatment 8 years ago. This treatment, along with the harvest of some intermingled mature crop trees in a few years, should open the crown canopy sufficiently to permit the development of a two-aged stand.

Although the growth rate on the black walnut in this stand is disappointing, monitoring the growth has provided me with the information I need to make some adjustments in the prescription to better achieve my goal of producing income from the sale of timber.

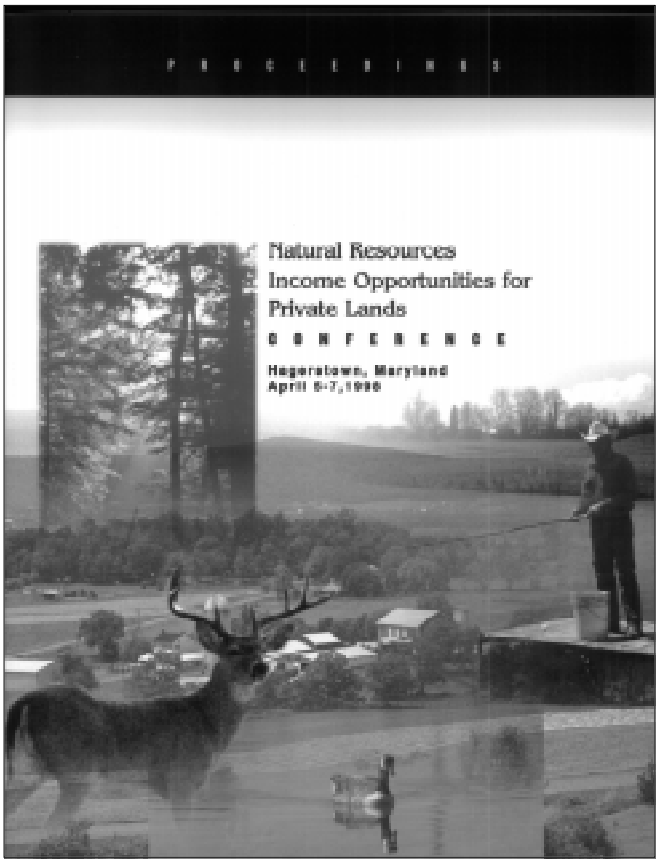
Note: As bad as this growth is, it can still be worse. In another stand on this property, growth on released black walnut crop trees averaged 1.2″ per decade during the same 8-year period. The stand is located lower on the slope, but it is not on a well drained soil. This information reinforces the importance of site when selecting black walnut crop trees.

* * * * *

ANNOUNCEMENT

Proceedings Available for Natural Resources Income Opportunities on Private Lands Conference

On April 5-7, 1998, the Natural Resources Income Opportunities on Private Lands Conference was held in Hagerstown, MD, to address the increasing interest of landowners and professionals in income opportunities related to natural resources and recreational access. Attended by 290 landowners and resource professionals from 23 states and the District of Columbia, the conference dealt with how to choose and manage a private land income opportunity while protecting natural resources and minimizing personal liability and financial risk. The 288-page proceedings covers the presentations made by 38 speakers, including landowners, consultants, Cooperative Extension staff, lawyers, foresters, and others. Topics in the proceedings include trends in recreation and policy, legal liability, marketing, evaluating the resource potential of your property, challenges, and management concerns such as managing risk, insurance needs, estate planning, and taxes. Papers are included on specific enterprises related to recreational tourism, recreational access, and forest farming and utilization. They include ginseng, maple syrup, custom sawmilling, fee fishing, recreational enterprises, aquaculture, hunting leases, forest guide services, and alternative forest products.



If you are a landowner or work with landowners interested in alternative income opportunities related to natural resources and recreational access, you should order this unique publication.

The proceedings cost $20 a copy, with four or more copies at $17 each, and eleven copies or more costing $15 each. Make a check payable to the Washington County Extension Advisory Council, and send it to: Conference Proceedings, Washington County Cooperative Extension, 1260 Maryland Avenue, Hagerstown, MD 21740. Inquiries may be directed to: (301) 791-1304.

Accuracy of Tree Measurements Essential When Monitoring Tree Growth

When talking about Crop Tree Management, I frequently emphasize the importance of monitoring crop tree growth. However, I also need to stress the importance of accuracy when measuring tree diameters at breast height. The diameter tape must be placed around the tree at the appropriate diameter breast high mark, and pulled snug with no sagging. Loose fits and sags result in exaggerated diameter measurements. If this occurs during the initial measurement, followed by an accurate re-measurement, the growth will be understated. If the initial measurement is accurate, but the re-measurement exaggerated, the error will be an overstatement of the growth for that period.

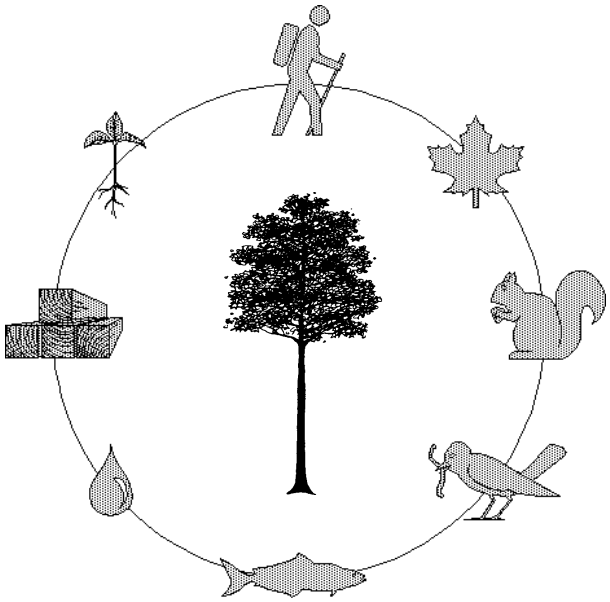
I paint a measurement mark on each of the trees that I monitor growth on so that every time I re-measure, I'm placing the tape at the same place on the tree. If all measurements are carefully taken at a permanently maintained dbh mark, and the tape is positioned with no sags or lopsided, loose fits, you can be confident that the growth figures you have obtained will give you the most accurate indication of crop tree growth. This makes the crop tree growth monitoring procedure a very reliable, valuable activity.

To accurately determine diameter growth on crop trees, it is important for the diameter tape to be snug and straight around the crop tree.

* * * * *

NORTHEASTERN AREA
State and Private Forestry

FOREST RESOURCES MANAGEMENT



Managing the forest for:

- ***recreation***
- ***aesthetics***
- ***wildlife & fisheries***
- ***water quality***
- ***forest products***
- ***soil productivity***

Primary contacts for forest management assistance in the Northeastern Area are:

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(603) 868-7699

St. Paul Field Office

Richard Wiest
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